NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE , NEW MEXICO

Hearing Date JUNE 3, 1987 Time: 8:15 A.M.

NAME	REPRESENTING	LOCATION
W. L. McCay	Vinden-Oilhess	Santa Fe
Chad Dickerson	Dickerson, Fisk & Vandiver	Santa Fe
Bill Peterson	Elf Aquitaine	Houston
J A Davidson	Self	Midland
J.M. Dupuy	ELF Horizontal Drilling	Houston
Bob Adolph	Elf Aquitaine	Houston
J.G. Reilly	ELF AQUITAINE, INC	Houston
Owen Lopez	Hinkle Law Firm	Santa Fe
W. T. Kellahin	Kellahin Kellahin Aubrey	Santa Fe
W. Perry Pearce	Montgomery & Andrews, P.A.	Santa Fe
Bob Huber	Bryan	Santa Fe
Dan Currens	Amoco Prod. Co.	Houston
James C. Allen	Amoco Prod. Co.	Houston
James W. Collier	Amoco Prod. Co	Houston
J.C. Heffley	Amerada Hess	Tulsa
R L Hocker	Citgo Service Oil & Gas Corp	Tulsa
Bob Hunt	"	Midland
Daniel Erickson	[illegible]	

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NAME	REPRESENTING	LOCATION
W. B. Hanson	Amoco	Denver
Debbie Domenyo	Independent	New Mexico
Berby, Mrs. E. J. Ross	Ind.	New Mexico
Tom Corbin	Ind.	New Mexico
Robert H. Strand	Atwood, Malone, Mannatman	Roswell
Robert H Pell	HEYCO	Roswell
Gordon Jahney	HEYCO	Roswell
Ramon G. Reyes	HEYCO	Roswell
William F. Carr	Campbell and Black P.A.	Santa Fe
Kurt Sommer	Thriftway / Ross Carbonics	Santa Fe
Ernest L Padilla	Padilla & Snyder	SF
James E Sperd	Permian Corp	S. Fe
Joe D. Ramey	Permian Corp.	Hobbs, NM
R. D. Hamm	Marathon Oil Co	Houston
Jim Bruce	Hinkle Law Firm	SF
John McCarty	Conoco, Inc	Hobbs, NM
Ernie Busch	NMOCD	Aztec

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISON
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

3 June 1987

EXAMINER HEARING

IN THE MATTER OF:

Application of Elf Aquitaine Petroleum for a horizontal directional drilling pilot project and special operating rules therefor, West Lindrith Gallup-Dakota Oil Pool, Rio Arriba County, New Mexico. CASE 9139

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Jeff Taylor
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Owen M. Lopez
Attorney at Law
HINKLE LAW FIRM
P. O. Box 2068
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. CATANACH: Call next Case 9139.

MR. TAYLOR: The application of Elf Aquitaine Petroleum for a horizontal directional drilling pilot project and special operating rules therefore, West Lindrith Gallup-Dakota Oil Pool, Rio Arriba County, New Mexico.

MR. CATANACH: Are there appearances in this case?

MR. LOPEZ: Mr. Hearing Examiner, my name is Owen Lopez, with the Hinkle Law Firm, appearing on behalf of the applicant, and we have two witnesses to be sworn.

MR. CATANACH: Are there other appearances?

Will the witnesses please stand and be sworn in at this time?

(Witnesses sworn.)

BOB ADOLPH,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. LOPEZ:

Q Would you please state your name and where you reside?

A I am Robert H. Adolph. I reside at 4610 Creek Bend, Houston, Texas.

Q By whom are you employed and in what capacity?

A I'm employed by Elf Aquitaine Petroleum. I'm the Manager of Regulatory Affairs and Joint Operations Coordination.

Q Have you previously testified before this Commission and had your qualifications accepted as a matter of record?

A No. This is my first appearance.

Q Would you therefore briefly describe your educational background and work experience?

A I graduated from Louisina State University in 1950 with a Bachelor of Science degree in petroleum engineering.

I then worked four years for Schlumberger as a field engineer. I worked nineteen years for Southern Natural Gas as a division drilling engineer. I drilled wells and produced wells in the Continental U. S. and in the off-shore area.

I then worked five years for Huber. I was Gulf Coast Manager for them; handled their drilling for the area from Texas to the Atlantic and from Oklahoma to the Gulf.

I then went to work for Elf Aquitaine. I have worked for them about nine years.

I started as Operations Manager for Wyoming. I then became the drilling manager for all of their drilling operations in Continental U. S..

I went to France. I was on the staff of the Operations Manager who handled the Western Hemisphere and Australia.

I am a Registered Professional Petroleum Engineer in the State of Louisiana. I've testified before the Alabama Oil and Gas Board, the Mississippi State Oil and Gas Board, Louisiana Department of Conservation, and the Texas Railroad Commission, and have been accepted by all these as an expert witness.

Q Are you familiar with the application of Elf Aquitaine in the case today?

A Yes, I am.

MR. LOPEZ: Are the witness' qualifications acceptable?

MR. CATANACH: Mr. Adolph is so qualified.

Q Mr. Adolph, would you first briefly describe what Elf is seeking in this case today?

A Well, Elf Aquitaines is requesting permission from the New Mexico Oil Conservation Division to drill a horizontal well in the western half of Section 14, Township 23 North, Range 3 West, Rio Arriba County, New Mexico. This is located in the West Lindrith Gallup-Dakota Field.

This well is planned to be horizontal in the Dakota A Sand and will penetrate two existing 160-acre units. This field was developed on 160-acre units and Elf is requesting that this well be allowed to service two separate 160-acre units.

The existing units are the northwest quarter and the southwest quarter of Section 14.

Elf also requests that the allowable be based on the current 160-acre unit allowable, which is 382 barrels of oil per day for each unit, or a total of 764 barrels of oil per day for this well.

There is currently a unit well producing from each of the previously mentioned 160-acre units. Their production will be taken from the 764-barrel allowable and the net allowable for our well will be so calculated.

Q I now would ask you to refer to what's been marked for identification as Elf's Exhibit Number One

and ask you to identify and explain it, please.

A Exhibit One is a land map. It shows the ownership of parcels of land offset to the location for the Elf Aquitaine Jicarilla-Thomas Horizontal Well No. 1. Elf Aquitaine has received a farm-in of the western half of Section 14, Township 23 North, Range 3 West. This area, plus others involved in the farm-in are shown in yellow on the land map.

The direct offset operator to the north and east of this half section is Amerada Hess.

The south and west offset operator is Meridian.

Q All right. I'd now like you to refer to what have been marked for identification as Elf's Exhibits Two and Three and ask you to explain what they are.

A Okay. Exhibit Two is a copy of a notice that we sent to all the offset operators. This would be Amerada Hess, Dave Thomas, Enterprise Gas Company, Meridian Oil, the Bureau of Indian Affairs, and Mobil Producing Company.

The letter outlines our proposal at this hearing. Attached to the letter were various exhibits which are being presented now.

Q All right. And what -- what are -- what is Exhibit Number Three?

A Exhibit Number Three is a receipts I received from each company. All six have received the notice.

Q All right. I'd now ask you to refer to what's been marked Exhibit Number Four and ask you to identify it.

A Exhibit Number Four is a cross section of our well. What we've attempted here is to show our entry into the Dakota A.

The well itself will be located 500 feet from the north line and 1500 feet from the west line of Section 14, Township 23, Range 3 West.

We plan to drill this well vertically to approximately 5600 feet and then begin our build-up so that we can enter the top of the Dakota A almost horizontal.

After entering the Dakota A we plan to drill approximately 2000 feet of a horizontal well.

Q All right. I'd now ask you to refer to what has been marked Exhibit Number Five and ask you to identify and explain it.

A Exhibit Number Five shows the structure and the Isopach map for the section in which we plan to drill this well.

The entry into the Dakota A, we anticipate having a thickness for that particular sand of about 40 feet. By the time we get to the end of the horizontal sec-

tion it will be approximately 50 feet thick or maybe 60.

The structure map shows very little occurrences of any nature. We think that the geology is just gentle. We anticipate no problem in drilling the well or maintaining our position in the sand.

Q Okay, and now I'd like you refer to what's been marked Exhibit Number Six and ask you to explain it.

A Okay. Exhibit Number Six shows the two 160-acre units and the horizontal section of our proposed well, where it will actually be in two different 160-acre units.

The northwest quarter of Section 14 is one unit serviced by Thomas Well No. 2. The southwest quarter of Section 14 is a separate unit serviced by Thomas Well No. 6.

We would like to have permission to let our well service both of these units.

Mr. Thomas has retained the rights to continue producing these two wells and the two units will continue to exist.

Production from our horizontal well will be allocated equally to these two units. The royalty ownership for both of these units is the same and there would be no inequity in the allocation of royalties for these two

units.

Working interest for these two units are also equal and there should be no inequities involved in this type of allocation.

The allowable for Elf's well, we'll request be based on the pool rules providing the current allowable schedule for West Lindrith Gallup-Dakota Field.

For each 160-acre unit the Gallup-Dakota allowable is 382 barrels of oil per day.

We request that our well be given twice the allowable, or 764 barrels of oil per day minus any production from Thomas' Wells 2 and 6.

Q Could you explain the reason for selecting the angle of trajectory for the well?

A Okay. We selected the azimuth of the horizontal section of the well to keep as far away from the wells that are presently producing, the Number 2 and the Number 6 Wells, and still stay within the current requirements that no well be located closer than 660 feet from any unit boundary.

Q Were Exhibits One through Six prepared by you or under your supervision?

A It was prepared under my supervision.

Q In your opinion would the granting of this application be in the interest of the prevention of

waste and the protection of correlative rights?

A I believe it would.

MR. LOPEZ: Mr. -- Mr. Examiner, I'd like to offer Elf's Exhibits One through Six.

MR. CATANACH: Exhibits One through Six will be admitted as evidence.

Do you have anything further?

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Adolph, is this going to be operated as units, essentially?

A Well, what we would prefer to do, we'd leave the two units exist and allow the well to be servicing the two units; attribute the production from the well to both units, because there may be a problem if we try to make one 320-acre unit superimposing two existing 160s.

Q So you'd want to leave it separate.

A I think this will provide continuity because we do have the production that may occur out of the Thomas Wells. I think one well is on production today. The No. 6 I understood was shut-in.

Q Do you have any idea how much those, the No. 2 Well and the No. 6 Well are currently making?

A Best of our knowledge the No. 2 Well is

making around 10 barrels of oil per day and the No. 6 is shut-in.

Q Who is currently operating the No. 2 and the No. 6?

A Oh, Thomas, and he retains the rights to that.

Q He will still operate them?

A Yes.

QUESTIONS BY MR. STOGNER:

Q Mr. Adolph, I'm Michael E. Stogner, Engineer with the New Mexico Oil Conservation Division here in Santa Fe, resident horizontal drilling expert; resume available on request.

A I've spoken with you (unclear).

Q Elf Aquitaine proposes to be the operator of the horizontal well, right?

A Yes. We will be the operator. The actual work will be done under a subsidiary. It will be the Elf --

Q Okay, now I --

A -- Aquitaine Horizontal Drilling and Production Company.

Q Now if this well is producing and is put on production, Elf Aquitaine still retains the right to pro

duce it.

A We will be the producer.

Q Okay. So has the BLM been contacted on the proposed well, having two operators in the same formtion in the same proration unit?

A Yes.

Q And what kind of correspondence did you have back from the BLM?

A I only have telephone conversations with them but they saw no problem.

Q Are you aware or do you know of any other instances within this state that there are two operators within the same horizon?

A No, but I understood under New Mexico rules that you could have more than one well producing from a unit; that the allowable would be granted to the unit and then shared by the wells on whatever basis there would be.

MR. LOPEZ: I might interject at this point, Mr. Examiner, it's -- I think Mr. Thomas to some extent is taking a wait and see attitude and is not giving up the rights to his marginal well, producing well, at this time; however, if we're as successful as we hope, his interest in continuing to maintain operations in competition with his other -- the rights to the other wells may be short lived.

MR. STOGNER: Mr. Lopez, since this is considered a pilot project I think we have the time. Would you look into that matter if these two wells are put on production or three wells are put on production and there's two operators of what kind of problems would exist if it is legal, and --

MR. LOPEZ: Yes.

MR. STOGNER: -- all the aspects on that and on any problems, would you address those?

MR. LOPEZ: I'll be glad to. I concur with Mr. Adolph's response since maybe I helped to coach him, but I will further consult with (inaudible.)

Q Okay. Mr. Adolph, I'm referring to Exhibit Number Four. This is -- you propose to kick off from vertical at 5600 feet. What kind of an angle build-up do you --

A It will be about the 3 degree.

Q Per 100 foot?

A Per 100 feet, yes. And then what we also plan to do is cut two cores, perhaps, in the Gallup. We'll leave the deviation of the well at 70 degrees at that point and cut our cores and then after that we'll build up at about a 5 degree per 100 below that.

Q Until horizontal is reached.

A Until horizontal.

Q How about your drilling media? Is this going to be fresh water mud, salt water mud, or oil mud, or oil --

A It will be just a standard mud. There is no oil mud planned for this well.

Q This technology has been done in some other parts of the world, has it not?

A Correct. Our company has been active in that and we have another witness that could perhaps give you better information than I can.

Q Okay.

A But we have drilled some horizontal wells in Pau, France, and Italy that were very succesful.

Q So he would be the one to ask about any particular problems that might be encountered.

A I think so. This will be my first experience with horizontal.

Q Now the -- the media that you will be drilling in is considered what, a fractured shale or fractured sandstone?

A I thought it was a fractured sandstone or primarily a sandstone. There are fractures, and I think this lends -- the horizontal drilling recovery would be from fractured zones enhanced, or you will enhance a recovery from fractured zones by drilling horizontally, because

you're able to get across the sand and extend into various fractured intervals that you wouldn't see with a vertical well.

Q So that's the whole purpose of drilling the horizontal is to intersect these -- these fractures.

A That, plus the fact that you are also extending the pay zone. We're looking at 2000 feet of well or hole within a productive interval. Normally, if you drilled a vertical well in here you're looking at something between 40 and 60 feet, and just comparing the thickness of the pay that you're looking at will enhance or increase your recovery.

Q Do you, or does Elf Aquitaine propose to fracture this well once it's down?

A We have no plans at the current time. We want to drill it and see what it will produce.

Q How about a casing program? What kind of a casing program does Elf propose?

A Okay, let me just check something just a minute.

Okay, what we plan to do is set a string, surface string would probably be 26 inch. Then we'll set a string of 13-3/8ths at approximately 5400 feet, just above our kick-off point. We'll then run 9-5/8ths string to be just above the Dakota, and then a 7-inch liner, slotted

liner, is what we're presently thinking about, would be used for the production string, just to keep the hole open.

Q Now, would this slotted liner extend all the way into the horizontal?

A Correct, it would go all the way to bottom, keep everything open.

Q Would the 7-inch slotted liner be cemented or just --

A Presently we're not thinking about cementing that. It's a matter of just keeping the hole open.

Q Do you have any idea of what kind of variations we might have as far as the direction?

A I'd prefer to let the next witness answer that. He has more experience with horizontal than I do.

MR. STOGNER: Mr. Examiner, I have no other questions.

MR. CATANACH: Are there any other questions of the witness at this time?

If not, he may be excused.

MR. LOPEZ: I'd like to call our next witness.

JEAN-MARC DUPUY,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. LOPEZ:

Q Will you please state your name and where you reside?

A I am Jean-Marc Dupuy. I am a French citizen and I am a resident in Houston, 11507 Highgrove Drive.

Q By whom are you employed and in what capacity?

A I am employed by Elf Horizontal Drilling and Production in Houston as Vice President - Reservoir Engineering.

Q Have you previously testified before this Commission and had your qualifications as an expert reservoir engineer accepted?

A No, this is my first testimony.

Q Would you therefore describe your educational background and work experience?

A I graduated from the Hydraulics Engineering School of Toulouse in France in June, '65, and from Toulouse University with a Master of Science in Physics and Fluid Mechanics.

Since then I have worked ten years as a hydrogeologist with several assignments in France, Greece, Libya, Morocco, and Chad; ten years as a petroleum reservoir engineer with FRANLAB, a subsidiary of the French Petroleum Institute, and almsot two years with HORWELL, a newly created joint venture between the French Petroleum Institute and Elf Aquitaine.

I am currently seconded by HORWELL to Elf Horizontal Drilling and Production in Houston and I work very closely with Elf Aquitaine Petroleum, its sister company, to promote horizontal dirlling in the U. S.

I am technically in charge of screening, evaluating, and selecting oilfields which would lend themselves to this new type of production.

MR. LOPEZ: I would submit the witness' qualifications.

MR. CATANACH: The witness is considered qualified.

Q Mr. Dupuy, would you tell us how Elf got involved in this business, give us a little history?

A In the late seventies Elf and French Petroleum Institute, IFP, decided to poool their capabilities in exploration and production and took up the challenge of horizontal drilling.

From 1980 to 1983 they successfully

drilled four horizontal wells, three in France and one offshore Italy.

The technology developed during this research program had the following characteristics:

Long radius method, with build-up rate of a few degrees per 100 feet of drilled lands, initially 3 degrees, now up to 7 degrees per 100 feet;

9-5/8ths cemented casing to the top of the reservoir, which usually is reached under 70 to 85 degree inclination;

8-1/2 inch horizontal hole completed with a 7-inch slotted liner;

High accuracy control of the trajectory inside the reservoir, which means about one degree, plus or minus, one degree in attitude, and plus or minus five, five feet in depth;

No special equipment required. All these wells have been drilled with conventional drilling equipment;

The possibility of coring, logging, acidizing the horizontal hole, and more recently of cementing the 7-inch liner;

Finally, the drainhole length can reach 2000 feet and probably more, depending on the application.

After this research program Elf Aquitaine

and IFP decided to create a new company, HORWELL, as a vehicle to bring the new, successful technology to the international petroleum industry.

HORWELL, which offices in France, has performed preliminary and engineering evaluation studies for Texaco, ARCO Indonesia, Agip, Japan National Oil, Petrofina, Maersk, which is a Danish company, Soquip, Canadian company, Sonatrack, the Algerian government company, and has even been on sites of four horizontal wells drilled under its supervision, one for Sohio, in '85, in Texas; one for B.P. in '86, on shore U.K., and two recently in '87 for The National Gas Company of India, offshore India.

Finally, very recently, Elf Italiana has drilled five more horizontal wells offshore Italy.

All these thirteen horizontal wells have been very successful both in drilling and completing the horizontal section.

Q When you said have been successful, what do you exactly mean? Do you mean both in terms of the technology as well as the production recoveries?

A Yes. First, the drilling technology is now no longer a matter of research. It's something that we consider as perfectly commercial; that is, that we can use to develop existing fields. We never had to sidetrack a well or we never lost a well when drilling.

Secondly, as far as the production is concerned, the average improvement in production rate is about five, and we got productivity index as high as twenty times that of a vertical well in (not clearly understood.)

Another example is that the last well drilled offshore Italy from a specially designed platform has been completed open hole with a large, 7-inch tubing, and is flowing heavy, viscous oil instead of pumping it in the otkher well.

So we consider that both technically and commercially, the technology is successful.

Q What type of horizons is horizontal drilling suitable for?

A Generally speaking, we look for rather thin oil columns. These may happen when you have a gas cap and/or a bottom water drive, for instance. In order to decrease your water or gas encroachment you can drill a horizontal hole which will be parallel to the contact, so you decrease your water production and beyond that, you improve your sweep efficiency because the sweep is much larger with a horizontal hole than with a vertical hole where you have a cone and there you have a cylinder moving upwards, for instance.

The second case, where you have oil, thin oil columns is when, like the Dakota, for instance, you have

only 40 or 50 feet of pay, while drilling horizontally you are going to increase your exposure to the reservoir by 40 times, so you increase your drainage area, you improve your areal sweep efficiency, and this is also another application of horizontal drilling.

Q Is the -- did you want to say something else?

A Yeah, maybe something else; a fractured type reservoir is something which is really very convenient to horizontal drilling because you increase your chances to cross many vertical fractured sands and produce and drain a lot, much, much more oil.

Q Is the targeted Gallup formation that's subject to this hearing the type of reservoir that Elf is looking for and could you explain why you selected this particular site?

A It is the Dakota formation which is the target. We decided to start first with the Rocky Mountain area for several reasons. Some of them are the land situation in this case, and also the spacing rules that usually prevail on many fields.

You understand that our horizontal hole needs usually more than 160 acres, so we had to look for rather convenient rules.

Also we were advised that the type of

formation we would find in the Rocky Mountain area could lend themselves to -- to this horizontal drilling.

After search, searching and screening the existing fields, we decided to go with the West Lindrith Field because it is a well documented area where all the wells have been successful; there is no dry hole; and further, it's a rather thin oil column where we know we are able to improve the recovery by improving the drainage quickly, and this is what we consider as a rather safe demonstration of our ability to drill such well and a demonstration of the interest in this new technology.

Q Okay. I know we've brought some exhibits here today which have been marked Exhibits Seven, Eight, and Nine.

Exhibit Seven, I think, is the technical bibliography. You might just briefly describe what it is.

A Uh-huh. These are two bibliographies that I prepared in Houston. One is more technical than the other but they demonstrate the interest that people and oil companies had in horizontal drilling since about 1941, is our first paper.

Since that time there in an increasing interest in horizontal drilling and you may know that at the last annual SPE meeting in New Orleans, New Orleans, there was a special session on horizontal drilling.

And the next exhibit is the last -- the most recent paper presented at the World Petroleum Congress in Houston last month of May. It is written jointly by Elf, HORWELL, and Eastman Christensen, and it shows which are the three types of horizontal drilling, which are their merits, and I think the conclusion is that these new technologies are no longer in the field of research; it's already something which is commercial and which probably has a great future.

MR. LOPEZ: Mr. Examiner, we brought -- we have one copy of a booklet that we don't need to introduce as an exhibit, but that the Commission might instruct -- might find instructive on who HORWELL is, which is a public/private joint venture between Elf, which is France's largest corporation, and its public petroleum institute, and as a --

MR. STOGNER: Do you need that back, Mr. Lopez?

MR. LOPEZ: No, that's for your -- that's for the file.

MR. CATANACH: Okay.

Q Were Exhibits Seven, Eight, and Nine prepared by you or under your supervision?

A Yes. Well, Nine was the paper --

Q Paper, right.

A -- presented by Elf and HORWELL and Eastman Christensen.

Q Right.

MR. LOPEZ: I'd like to move the introduction of our Exhibits Seven, Eight, and Nine.

MR. CATANACH: Exhibits Seven, Eight, and Nine will be admitted into evidence.

Q Is there anything further you'd like to add?

A No.

MR. LOPEZ: That concludes our direct.

QUESTIONS BY MR. STOGNER:

Q Mr. Dupuy, how many other reservoirs in the United States did you look at before you decided on New Mexico?

A We have been using several consultants here in the U.S. to screen, to help us to screen the possible targets to our horizontal drilling; a consultant in Farmington, Mr. Bruce Black, that you may know; in Denver; and in Houston.

We asked them to screen New Mexico, Colorado, Utah, and Wyoming, and part of Montana, but not much.

So I can say we looked to -- or they

looked first to a lot of fields and I looked to their selection. I had to evaluate what they had selected for me because I am not used to the U.S. geology, you know. I'm just in the U. S. since 18 months now.

So I consider I have probably selected something like 25 fields that could be interested -- interesting, and finally I came up to our board with six possible applications and they decided to go with West Lindrith first because, as I told you, it was a rather safe shot, I would say, for the first demonstration of our capability.

We believe that there is a lot to be done in more risky type of reservoir, like fractured reservoir, and our cores, the cores we shot while drilling this well, are to get a better evaluation on developing the Gallup by horizontal drilling techniques and the Gallup has a huge extension over the San Juan Basin. And there are some other fractured shales in Colorado that we would like to test sometime and probably develop if it works out we could.

Q Has this technology of the long, sweeping horizontal drilling, if you will, has it been successful in the United States before or will this be the first test, to your extent?

A That -- well, you -- there has been some application here in New Mexico about ten years ago by ARCO,

ARCO for some test in the Lea County Empire-Abo, but these first, these first holes developed were smaller and shorter.

The first short -- long drain was drilled by Sohio in West Texas and with HORWELL as a contractor.

Then more recently Sohio drilled three wells in Prudhoe Bay, offshore, both for extended reach and also to limit water encroachment in their oil producers.

There has been one well drilled last March by BTM under contract with DOE in the Appalachian and this was a gas well. This is a gas well still under test.

Otherwise there has been a lot of smaller and shorter lateral drilling but not, as far as I know, not that long and deep holes have ever been drilled in the U. S. except these one, two, three, four, five, now.

In Canada there have been a lot of tests by Esso in Cold Lake, more wells, and some by Texaco in Fort McMurray and Esso (not understood).

Q The wells that you alluded to earlier in India, the U.K., and Italy, did Elf have any problems? Was there any -- now you said there was no problem in drilling, but did you run into any specific instances in which there were potential problems or --

A No, I was not on site and as far as I know there has not been any completion, drilling or comple-

tion problems.

Q How about the deviation? How much of a deviation did you notice on these off of your proposed deviations on those wells?

A It's, as I told you, it's a few feet, about 5, plus or minus 5 feet from the target, and what we say, that we are able to drill a 20 to 25 foot pay because we are plus or minus 5 feet and we are confident on the top of the formation of plus or minus 5 feet, too, so we are sure to be able to develop 20 to 25 feet of pay. This is due to the accuracy of the documents we have and our drilling of them.

MR. LOPEZ: And I think he earlier stated, Mr. Stogner, that the bottom hole, they can reach the bottom hole target within one percent accuracy, has been their experience.

Is that correct?

A Yes.

Q As far as your measuring tools, are there any special tools required or needed for that?

A What we use is MWD, measuring wide drilling device, which give us the location of our well bits and the gamma ray and resistivity and drill time on the rig floor.

We are able with this device to correct

our trajectory if there is any deviation. We also run from time to time, additional surveys to check our trajectory.

Q What size of a drilling rig will you be proposing to use in the --

A Normally we ask for a 50 percent excess capacity for the depth of the target.

For instance, here we are going to drill down to 7200 feet with a rig capable of drilling to 10, even 12,000 feet.

If we go deeper, we need a top drive but not in that case. It's convenient depth.

We have softwares which give us drag forces when pulling out or running in the bottom azimuth, so we can measure and we can know which type of rig we exactly need to be safe.

Q Will you be utilizing aluminum or steel drill pipe?

A Excuse me?

Q Aluminum drill pipe or steel drill pipe?

A I know we use nonmagnetic collars above the -- something like that, but as a reservoir engineer, I can't answer you. But I think it's really classical equipment.

MR. LOPEZ: Mr. Adolph can address it exactly.

MR. ADOLPH: Yes, what we're looking at is a National ADB rig capable of 10,000 feet or more, and it would be just your cenventional drill pipe. We're not planning anything special -- any different drill pipe, just the conventional.

Q How much drill string can be in the hole at one time once you've reached TD?

MR. ADOLPH: Well, we're going to 10,000 feet.

Q Okay, 10,000 foot hole.

Just a matter of record, directional drilling surveys will be taken of the wellbore?

A Yes.

MR. STOGNER: I have no further questions of this witness at this time.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Dupuy, you stated that you obtained producing rates from five to twenty times that of a conventional well?

A Producing rates of five times.

Q Five times.

A Productivity index if we include the drawdown of the well may reach maybe twenty times higher.

This means that in a horizontal well we need less drawdown pressure to produce the amount of oil because we have less pressure losses along a horizontal drain than in a vertical one. In a vertical well you have a radial system of flow so you have increased losses close to the well.

In a horizontal plane you have a linear parallel flow and you don't have this concentration of flow close to the outlets, so you distribute your losses along the 2000 feet of drain and you decrease your pressure losses so you can improve your productivity in that.

Q I see. Are there any calculations that are available to determine exactly what kind of area this well would drain, this type of well?

A No, there are calculations about the productivity index, initial weight, but about the drainage area itself, what everybody agrees to show is that the horizontal will drain, at the end of the drain, the two ends of the drain, the equivalent of a vertical well, half the vertical well, and in between the length times the diameter of the vertical drainage area.

This is described in the recent paper that you got, Exhibit Nine.

So the longer is your well, the larger is your drainage area.

Q In your opinion will the well, the proposed well cause any excess drainage of offsetting acreage?

A No. We have chosen both the section and the azimuth so that we shall surely not drain the excess unit, but we are far enough from the unit line and far enough from the existing wells.

Q And you've had no objection from any offset operators on this?

A No, we wrote to them; no objection.

Q Mr. Dupuy, how does the producing life of the well compare to that of a conventional hole? Is it about the same?

A Yes, it's about the same. We have run economical simulation, economic simulation on ten years, but it could go further but -- well, we based our evaluation on a ten year production.

Q So you're just more efficiently draining that acreage, is what you're doing with this type of drilling?

A Yes.

MR. CATANACH: Okay, I guess we don't have any further questions of the witness.

Mr. Lopez, as I understand it, you're going to check with BLM on any problems they might have with multiple operators?

MR. LOPEZ: Correct. We've had initial contact with them and they have raised no objection.

As I said earlier, we don't

think it's going to be a concern that will last long after the well is drilled, particularly in light of the marginal capability of the only existing well on the two units at the present time.

MR. CATANACH: Are there any other agencies who might have a jurisdiction over this area or --

MR. LOPEZ: BIA.

MR. CATANACH: Have you talked to BIA?

MR. ADOLPH: Not on that particular matter. I've had contact with the BIA concerning the drilling of a well. I spoke with Mr. (not understood), I think it was. He showed great interest in the well and thought it showed merit.

I've received no correspondence from him although a letter was sent to him requesting a letter of non-objection. I've had no correspondence further than that.

MR. CATANACH: You've not received that letter, then.

MR. ADOLPH: No.

MR. CATANACH: Why don't we leave the record open until you contact the BLM and maybe get something in writing from Mr. Lopez, and maybe, if you

can, get a letter from the BIA back.

MR. LOPEZ: Okay. I'll stay in touch. I'll do my best.

We would like to facilitate it. We're trying to facilitate it through each agency.

MR. CATANACH: Okay. When do you propose drilling or commencing the well?

MR. ADOLPH: I plan to stake the well next week and make my application to the BLM at that time because I think there are some -- have to conclude it in 45 days to get that affirmative action.

MR. CATANACH: Okay.

MR. STOGNER: Mr. Lopez, we seem to be having a problem here about you've got two -- or a proration unit in the same formation, the same pool, and it has two operators. That has not been done and that seems to be the problem of issuing permits and such as that, so that's the reason that we want to keep the record open, but those can be addressed and taken care of.

MR. LOPEZ: As we, I think, discussed earlier, we have common royalty, we have common working interest ownership under the two wells. Mr. Thomas, who is the operator, current operator of both units, has been in close communication and contact with the other working interest owners.

It appears that all working interest owners and royalty owners are supportive of the application and on the understanding that the production will be equally shared between the two units with credit being given to the only existing well in either unit that would be producing at the time at which the well was producing in the northwest of 14.

But I will do everything I can to assure you that we have no problems in that regard.

MR. CATANACH: I think that's -- is that all we have in this case?

MR. ADOLPH: Yes. Thank you, very much.

MR. CATANACH: We'll leave the record open until I receive that further information from you at which time we'll take it under advisement.

MR. ADOLPH: Fine, thank you.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY the foregoing Transcript of Hearing before the Oil Conseration Division (Commission) was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9139, heard by me on June 3 1987.

David R. Catanach, Examiner
Oil Conservation Division